Claims

What is claimed is:

1. A head-stage for implanting as a tissue interface, comprising:

a first connector coupled for receiving a plurality of electrical signals;

a flexible substrate coupled to the first connector and including a plurality of conductors for the electrical signals;

a stiffener substrate coupled to a portion of the flexible substrate;

an electronic circuit disposed on the flexible substrate above the stiffener substrate and having inputs coupled to the plurality of conductors; and

a second connector supported by the stiffener substrate and coupled to an output of the electronic circuit.

2. The head-stage of claim 1 wherein the flexible substrate includes benzocyclobutene.

3. The head-stage of claim 1 wherein the flexible substrate includes polyimide.

4. The head-stage of claim 1 wherein the flexible substrate overlies a portion of the stiffener substrate.

5. The head-stage of claim 1 wherein the electronic circuit performs signal processing on the electrical signals.

6. The head-stage of claim 1 wherein the flexible substrate and stiffener substrate are implanted under a skin surface of a test subject.

7. The head-stage of claim 1 wherein the second connector is a zero insertion force type connector.

8. A head-stage, comprising:

a flexible substrate including a conductor for conducting an electrical signal;

a stiffener substrate coupled to a first end of the flexible substrate;

an electronic circuit supported by the stiffener substrate and having an input coupled to the conductor; and

an external interface coupled to an output of the electronic circuit and supported by the stiffener substrate for transmitting the electrical signal.

9. The head-stage of claim 8 wherein the flexible substrate includes benzocyclobutene.

10. The head-stage of claim 8 wherein the external interface includes a first connector supported by the stiffener substrate and coupled to an output of the electronic circuit.

11. The head-stage of claim 10 wherein the first connector is a zero insertion force type connector.

12. The head-stage of claim 10 further including a second connector coupled to a second end of the flexible substrate.

13. The head-stage of claim 8 wherein the flexible substrate overlies a portion of the stiffener substrate.

14. The head-stage of claim 8 wherein the flexible substrate and stiffener portion are implanted under a skin surface of a test subject.

15. The head-stage of claim 8 wherein the electronic circuit conducts the electrical signal bi-directionally along the conductor.

16. An integrated head-stage, comprising:

an integrated substrate having a first portion forming an electrode for implanting into live tissue and a second portion forming a flexible substrate and including a conductor for conducting an electrical signal;

a stiffener substrate coupled to an end of the flexible substrate opposite the electrode; and

an external interface supported by the stiffener substrate for transmitting the electrical signal.

17. The integrated head-stage of claim 16 wherein the external interface includes an electronic circuit disposed above the stiffener substrate and having an input coupled to the conductor.

18. The integrated head-stage of claim 17 wherein the external interface further includes a first connector supported by the stiffener substrate and coupled to an output of the electronic circuit.

19. The integrated head-stage of claim 18 wherein the first connector is a zero insertion force type connector.

20. The integrated head-stage of claim 16 wherein the electrode and flexible substrate include benzocyclobutene.

21. The integrated head-stage of claim 16 wherein the flexible substrate overlies a portion of the stiffener substrate.

22. A head-stage for implanting as a tissue interface, comprising:

a flexible substrate including a conductor for conducting an electrical signal;

a stiffener substrate coupled to the flexible substrate; and

an external interface supported by the stiffener substrate for transmitting the electrical signal.

23. The head-stage of claim 22 wherein the flexible substrate includes benzocyclobutene.

24. The head-stage of claim 22 wherein the external interface includes an electronic circuit disposed above the stiffener substrate and having an input coupled to the conductor.

25. The head-stage of claim 24 wherein the external interface further includes a first connector supported by the stiffener substrate and coupled to an output of the electronic circuit.

26. The head-stage of claim 25 wherein the first connector is a zero insertion force type connector.

27. The head-stage of claim 22 wherein the electronic circuit conducts the electrical signal bi-directionally along the conductor.